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W. E. H.

An
Inaugural Dissertation
On
Intermittent Fever
Submitted To the Examination
Of the
Trustees And Medical Faculty
Of the
University Of Pennsylvania
For the Degree
Of
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By
Charles Shoemaker
Of Pennsylvania
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1826.

satisfactory

A Dissertation On Intermittent Fever. &c.

The title of Intermittent is applied to that kind of fever which consists of a succession of paroxysms, between each of which there is a distinct intermission from febrile symptoms, or an apyrexial period.

Different names have been applied to this fever, according to the length of time observed between the periods of its return. When the disease consists of a number of paroxysms, it is generally observed that the intervals between them are nearly equal; but these intervals are of different lengths in different persons, or in the same person at different times. The most usual interval is that of forty eight hours, which is called Tertian. The next most frequent is that of twenty four hours, and is named Quotidian. There is another of seventy two hours, which is termed the Quartan.

When these fevers occur in the spring of the year, they are called vernal; and when they arise in autumn, they have received the name of autumnal.

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Of tertian and quartan intermittents there are several varieties. The following may be enumerated as of the most frequent occurrence. The double tertian, having a paroxysm every day, with the alternate paroxysms alike. The double tertian, with two paroxysms every other day. The tripple tertian, with two paroxysms on one day, and one on the next. The double quartan, with two paroxysms on the first day, none on the second and third, and two again on the fourth. The double quartan, with a paroxysm on the first day, and another on the second, but none on the third. The tripple quartan, with three paroxysms every fourth day. The tripple quartan, with a paroxysm every day, every fourth paroxysm being alike.

Intermittents frequently prove obstinate, and are of long duration, especially in warm climates; and they not unfrequently resist every mode of treatment, so as to become very distressing to the person affected; and not unfrequently give

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rise to other chronic complaints, particularly an enlargement of the liver and spleen.

Marsh miasmata, or the effluvia arising from stagnant waters, or marshy ground, when acted upon by heat, are supposed to be the most frequent exciting cause of this fever. In low marshy ground, the putrefaction of both vegitable and animal matter is always going on in the warm seasons; and hence it is generally believed, that vegitable or animal putrefaction imparts a peculiar quality to the watery particles of the effluvia arising from thence. According to the observations of some Physicians, it has been stated, that marsh miasmata, when much diluted with aqueous exhalations, as in seasons when an unusual quantity of rain has fallen, are nearly inert; but when arising from stagnant waters of a concentrated foulness in consequence of great drought and heat in the latterend of summer and the

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begining of autumn they act with great violence and malignancy. People in warm climates usually take their exercise in the evening, being prevented through the day by the excessive heat; the cool and damp air to which they are thereby exposed, not unfrequently produce fever. The winds in some marshy countries produce fever when they blow over marshes, and cease to spread when the direction of the wind is changed. A poor diet, excessive fatigue, loss of sleep, intemperance in eating and drinking, great anxiety, exposure to cold, sleeping in damp rooms or beds, wearing damp clothes, a warm moist or cold damp atmosphere, the sudden suppression of an accustomed evacuation, the recession of eruptions, all which have been ranked among the exciting causes of intermittents: but it is more reasonable to suppose that these circumstances act by inducing that state of the system which predisposes to these complaints. By some it has been imagined,

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that intermittents may be communicated by contagion, but this supposition is by no means consistent with general observation.

One peculiarity in this fever, is its great susceptibility of a recurrence from very slight causes, as from the prevalence of an easterly wind, or from the repetition of the original exciting cause. It would appear likewise that a predisposition is left in the system, which favours the recurrence of the complaint In this circumstance, intermittents differ from most other fevers, as it is well known that after continued fever has once occurred and been completely removed, the person so affected is by no means so liable to a fresh attack of the disorder, as one in whom it had never taken place.

The most singular circumstance in the history of this disease, is its periodical occurrence. Why an irritation so severe as to have produced the most violent and distressing fever, should

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become perfectly dormant, and having remained so for the space of twelve, twenty four, or forty eight hours, recur in all its original strength, to pursue again the same course: and why this order of things should continue for months and even years, is beyond my power to answer satisfactory. It has indeed been said, and may be perhaps again, that the excitability of the part immediately acted upon by the morbific cause, having become exhausted by the violence of impressions, requires for its restoration the lapse of a definite period, and that this restoration is no sooner effected, than the original cause acting again, reproduces its original train of phoenomena: but this position, admitting it to be true, is nothing but a simple statement of a fact, instead of an assignment of an efficient cause, far from affording an explanation: therefore it is itself a subject difficult to be explained. Some writers in their attempts to solve the problem

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of the periodical nature of the intermittent fever, have added to the supposed effect of exhausted and renovated excitability, the influence of the solar or lunar day; others the influence of the earth revolving on its axis, connected with that of electricity and gravitation, as being uniformly the same at given hours, and calculated therefore for the production of the same affect; others again have attributed the phoenomenon to the force of habit, and the identity of impression produced by an identity of causes in us and around us at given hours; and many other wild hypothesis, which would be a waste of time to insert. In the present state of medical science all that we can do, is to assume the periodical nature of intermittents as an ultimate fact, and refer it to a law of our nature not yet understood. The periodical character of many other complaints are likewise not well understood; epilepsy and insanity are periodical diseases: so in like manner are asthma and gout. In tetanus

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the muscular spasm intermit and recur without any apparent cause for such a change: so do the pains of cholic; the gripings in diarrhoea; the tormena in dys=
=entery. In these cases, more especially in tetanus, col=
=ic, and the parturient process, the presence of the irritating cause is uniform; while its effects are in=
=termitting. In them therefore, no less than in inter=
=mittents, the suspension of the irritation takes place under the influence of the irritating cause. These with many other kindred facts, we are forced to refer to the same original law of our nature, from which we would derive the phoenomena of intermittents. They are inexplicable at present, but yet it is hoped that some future discovery may unravel the mys=
=tery. Each paroxysm of an intermittent fever is divided into three different stages, which are called the cold, the hot, and the sweating stages or fits. The cold stage commences with languor, a sense of debility and sluggishness in motion, frequent yawning and stretching, and an aver=

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=sion to food; the face and extremities become pale; the features shrink; the bulk of every external part is diminished; and the skin over the whole body appears constricted, as if cold had been applied to it: at length the patient feels very cold, and universal rigors come on; the respiration becomes small, frequent and anxious; the urine is almost colourless; sensibility is greatly impaired, and the pulse is small, frequent, and often irregular; in some instances, drowsiness and stupor have prevailed in so high a degree as to resemble coma or apoplexy, but this is by no means a common occurrence: these symptoms abating, after a short time the second stage commences with an increase of heat over the whole body, redness of the face, dryness of the skin, thirst, pain in the head, throbbing in the temples, anxiety and rest=
=lessness, the respiration is fuller and more free; but still frequent, the tongue is furred, and the pulse has become regular, hard and full.

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If the attack has been very severe, then perhaps delirium will arise; when these symptoms have continued for some time a moisture breaks out on the forehead, and at length becomes a sweat, and by degrees extends itself over the whole body; as this sweat continues to flow; the heat over the body abates, the thirst diminishes, the urine deposites a sediment, respiration is free and full, and most of the functions are restored to their ordinary state. The patient is however left in a weak and wearied condition: this constitutes the third stage.

Having pointed out the phenomena usually attendant on a paroxysm of intermittent fever, and likewise the mode of succession, it may not be unworthy of observation to notice, that in different cases they may prevail in different degrees; that the series of them may be more or less complete; and that the several stages in the time they occupy, may be in different proportions to each other.

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Such a depression of strength has been known to take place on the attack of an intermittent fever, as to cut off the patient at once: but an occurrence of this kind is very uncommon. Patients are seldom destroyed in intermittents from general inflammation, or from a fullness of the vessels, either of the brain or of the thoracic viscera as happens sometimes in a continued fever: but when their duration is of considerable length, they are apt to induce other complaints, such as loss of appetite, flatulency, scirrhus of the liver and spleen, dropsies, and general debility, which in the end now and then prove fatal. In warm climates particularly, intermittents are very liable to terminate in this manner if not speedily removed; and in some cases they degenerate into continued fevers. When the paroxysms are of short duration, regular in their recurrence, and leave the intervals quite free, we may calculate on a speedy recovery: but when they are long, violent, and attended with much anx-

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-iety and delirium, the event may be doubtfull: other unfavourable symptoms are, great prostra-tion of strength, vertigo, foetid excretions, the pres-ence of dysentery cholera morbus, enlargements of the liver and spleen, inducing dropsy or jaundice, and convulsions occurring during the paroxysms preceded by coma.

Relapses are very common to this fever, at the distance even of five or six months, or even a year:

Autumnal intermittants are more difficult to remove than vernal ones.

Dissections of those who have died of an inter-mittent, show a morbid state of many of the viscera of the thorax and abdomen; but the liver, and organs concerned in the formation of bile, as likewise the spleen and mesentery, are those which are usually most affected.

The indications of cure in the treatment of intermittents are, first to put as speedy a stop as possible to the fit when it has taken place:

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and secondly, during the intermission to prevent its return at the usual or any after period, both by exciting a new action in the system by administering certain remedies at the commencement, or immediately before the accession of the cold fit, thereby destroying the morbid concatenation induced by the cause of the disease, and invigorating the body. By administering an emetic immediately before the accession of the cold stage, we may sometimes be enabled to destroy the morbid concatenation induced by the cause of the disease, and thereby prevent a return of the paroxysms. To free the bowels of their offending contents, a dose of calomel combined with jalap or rhubarb may be given; and if the patient be of a full habit with headach and flushed countenance, the pulse hard and quick showing an inflammatory disposition, bloodletting will be necessary. Having by these means prepared the system, tonic remedies should be next employed

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Of these, the peruvian bark is the most celebrated, and may be used with safety in the time of intermission, provided there be no disease of the abdominal viscera: in that event, tonics must be withheld until these affections are removed. As soon as the system is properly prepared for the administration of tonics, the peruvian bark may be administered, in doses as large as the stomach will conveniently bear, and at such intervals, that one or two ounces may be taken during the intermission: should it disagree with the patient in substance, it may be administered in some other form, as the cold infusion, decoction, or tincture. The sulphate of quinine has of late received great reputation in the cure of intermittents: it may be given in the dose of a grain, in the form of a pill, or in solution: eight grains appear to be equal to one ounce of the best peruvian bark. In the mean time, strict attention must be paid to the habit

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of body, for in vain shall we expect to cure inter-
-mittents, if the bowels be not kept open, and the
skin moist. When therefore the bark produces cos-
-tiveness, five or six grains of rhubarb or some mild
laxative should be added to each dose; and incase
of cold phlegmatic habits with a dry skin, the
addition of ten or fifteen grains of virginia snake
root will be proper. In some instances the bark
produces copious and severe purging; this debilita-
-ting effect may be prevented by adding five or
six drops of laudanum to each dose; and when
the patient is troubled with sourness on the sto-
-mach, flatulence and pain, the bark may be
taken in lime water, or conjoin with each dose
eight or ten grains of salt of tartar or magnesia.
some patients are subject to profuse sweats from
debility; in such cases the bark should be uni-
-ted with a few grains of the rust of steel; or
ten or fifteen drops of elixir vitriol, and taken
in wine: but when these evacuations proceed as

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they frequently do from an imperfect cure, accompa=nied with great and intense heat during their prevalence, we must immediatly resort to the pre=paratory remedies, blood-letting, cathartics, and diaphoretics. Sometimes the fever will not yield to the bark even when all the usual preparatory remedies have ben employed. In such cases we may justly suspect the liver to be affected, particularly if the countenance be either livid or pale, or of a yellowish cast, and in that event the use of the bark should be suspended until those obstructions be removed. For this purpose the blue pill may be given night and morning until a ptyalism, with an increased flow of saliva; which will gen=erally succeed: but if it should fail, the nitric acid diluted, should be administered; as this acid is not always to be got of equal strength, it would be best to make a quart of water as sour with it as can be drunk, which quantity may be taken daily by an adult in small and

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repeated doses. and to prevent its injuring the teeth it should be sucked through a quill. After a ptyalism is effected, recourse must be had to one or other of the strengthening remedies, to give tone to the system.

From the tenor of these observations it follows, that the Peruvian bark is not always to be employed as a remedy in every case of intermittents; but that much caution is necessary in the use of it, lest it be turned into abuse: for unless the system be properly prepared by suitable remedies, the administration of bark or any other tonic is an error fraught with the most serious consequences.

The Black oak bark of America possesses in a great measure the same qualities as the Peruvian bark. as has been verified by repeated experiments, not only in the cure of intermittents, but other diseases hitherto treated with the Peruvian bark: it may be taken in the

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same manner, only in larger doses. In substance it is most efficacious; and if well pulverized, it will be found more palatable than the Peruvian bark, and not so apt to excite vomiting. Another mode in which this remedy may be employed to great advantage from its abundance in our country, is by bathing twice or thrice a day in a strong decoction of it; which, to children and patients whose stomachs will not retain medicine, will prove exceedingly beneficial. When the Black oak bark is not convenient, the Red oak bark, though considered less efficacious, should be substituted, which has been witnessed to have had the happiest effect in debilitated persons.
Bathing in a strong decoction of it lukewarm is recommended, particularly in the last stage of fevers. Dr. Barton late professor of Botany, assures us, that he has employed the bark of the Spanish oak in gangrene, with the happiest effects; and that he considered it in powder equal

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to the Peruvian bark The common Dogwood bark of our country is also an excellent substitute for Peruvian bark, particularly in the cure of intermittents: likewise the bark of the wild Cherry tree, and the American Poplar all of which may be given in the same forms and doses as the Peruvian bark that is, as much as the stomach will bear The Columbo root is a usefull medecine in this complaint, and will often be retained by the stomach when the bark in every form has been rejected: it is also a usefull remedy joined with steel. ℞ Columbo Root } aa ℥ß
Rust of Steel }

Mix and divide them into sixteen powders; one of which may be taken thrice a day, by patients disposed to be dropsical, or who have a swelling and hardness of the spleen, especially if a purge be previously given, and some mercurial action excited in the system by one or two grains of Calomel taken every night and morning

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for a few weeks. While vitriol has been considered to be a valuable remedy in the cure of intermittents in the dose of from 6 to 8 grains; and which has frequently succeeded when the bark has failed: but like other tonic medecines it requires that the stomach and bowels should be freed of their morbid contents before any good affect can result from its use. Therefore some evacuating medecine is generally necessary, after which the vitriol may be administered every three or four hours during the intermission; and gradually increaseing the dose as the system becomes habituated to its action. But among the remedies for intermittents none appears more efficacious than a solution of Arsenic from five to twelve drops may be administered twice or thrice a day, and which may be given with perfect safety to patients of every age, commencing with small doses, and proportioning them to the age and constitution of the patient.

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Stimulants administered before the fit, by inducing a salutary change in the system, have frequently overcome the disease. It is in this way that emetics are considered usefull in the coming on of the fit. The recurrence of the fit has been frequently prevented by giving a large dose of laudanum or aether about an hour before the expected paroxysm. In Dr. Lind we find an advocate for the exhibition of opium likewise in the hot fit. He tells us he has observed that, taken during the intermission, it had not the least effect either in preventing or mitigating the succeding paroxysm: when given in the cold fit, once or twice seemed to remove it; but that when administered half an hour after the commencement of the hot fit it generally afforded immediate relief. When given in the hot fit, he observed the following effects to ensue. First it shortened and abated the fit, and this with more certainty than an ounce of the bark was found to effect the disease. Second it gen-

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-erally gave a sensible relief to the head, took off the burning heat of the fever, and occasioned a sweat. This sweat was attended with an agreeable softness of the skin instead of that burning sensation which affects patients sweating immediately after the hot fit, and was always more copious than in those who had not taken opium. Third, it often procured a soft and refreshing sleep to a patient tortured in the agonies of the fever; from which he awaked bathed in sweat, and in a great measure free from all complaints. The Doctor informs us that he has always observed that the effects of opium are more uniform and constant in intermittents than in any other dis-ease and are there, more quick and sensible than those resulting from the use of any other medecine. An opiate thus given soon after the commence-ment of the hot fit, by abating the violence, and lessening the duration of the fever, preserves the constitution so entirely uninjured, that since he used opium in agues, a dropsy or jaundice

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has seldom attacked any of his patients in those diseases. When opium did not immediately abate the symptoms of the fever, it never increased their violence: on the contrary most patients reaped some benefit from an opiate given in the hot fit, and many of them bore a larger dose at that time than they could at any other. Dr Lind offers it as his opinion, that opium in this disease is the best preparative for the bark, as it not only produces a complete intermission, in which case alone that remedy can be safely administered; but occasions such a salutary and copious evacuation by sweat, as generally to render a much less quantity of bark requisite.

Dr. Kellie, an ingenious surgeon of the British navy, states that many instances have occured of the good effects of compression by tourniquets or bandages applied so as to obstruct the circulation in two of the extremeties. The plan pursued by him was to apply the instrument on one thigh

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and on one arm of opposite sides at the same time. In two minutes after the application of the tourniquets the shaking and other symptoms of the cold stage entirely ceased, a mild hot stage was immediately induced, and the patient found himself quite relieved. After suffering the instruments to remain on for about fifteen minutes they were removed, and the cold symptoms did not return. He further states that if the tourniquets be applied previous to the accession of the paroxysm, the cold stage will be entirely prevented, and that where the cold stage of an ague is either thus shortened or altogether prevented, the following hot stage will be rendered both milder and of shorter duration.

As intermittents are liable to recur, one excellent means of prevention as well as cure, is to wear flannel next to the skin, and to exchange the situation where the disease was contracted, for another, even though not of a healthier air: this alone has often effected a cure. In like manner a change of

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medicine is as necessary as a change of air, that the system may not become habituated to any one mode of treatment; therefore it ought to be remembered that neither bark nor any other tonic medecine should be continued longer than a fortnight at a time, but should be changed for another article whose virtues are nearly the same. After a week or so, the former may be resumed in case the disease should prove obstinate; and to bring about the necessary change in the constitution, large doses should be given. As to regimen in the cold fit very little more is necessary than some warm drinks, in the hot fit the drink may be barley water, mint or balm tea, Lemonade, toast and water, when the sweating begins. The drinks just enumerated may be enlivened with wine; and if the patient be able to take it he may be allowed some nourishment during the intermission. The diet should be as nutricious as the patients appetite and digestion will allow. Every thing that

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tends to keep up a gentle perspiration and to give tone to the vessels is usefull: hence moderate exer-cise is singularly proper, since nothing more conduces to these effects: the exercise should be of that kind to which the patient has been most accustomed, and taken in the open air, unless wet weather or a damp situation forbid. But the ut-most care should be taken that exercise be not pushed to fatigue, which, by inducing debility, carries thousands to untimely graves. ⌐